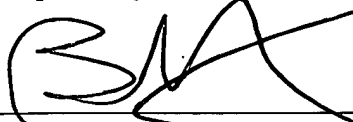


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: RAMSHAW, Colin and
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ASSIGNEE: Protensive Limited (A UK Company)

U.S. APPLICATION NO.: 09/913,902

INTERNATIONAL APPL. NO.: PCT/GB00/00521 I.A. FILING DATE: 02-17-2000

FOR: "PROCESS FOR THE CONVERSION OF A FLUID PHASE SUBSTRATE BY
DYNAMIC HETEROGENEOUS CONTACT WITH AN AGENT"

ATTORNEY DOCKET NO.: A01204US (98148.18)

* * * * *

Copy of Amendments Showing Changes

The application has been amended in the foregoing amendment to read as follows (added matter is underlined and omitted matter is in brackets). To facilitate prosecution all claims have been included, even those not amended:

1.(Amended) A reactor apparatus including a support element [(3)] adapted to be rotatable about an axis [(6)], the support element [(3)] having a surface [(5)], feed means [(4)] for supplying at least one reactant [(15)] to the surface [(5)] of the support element [(3)] and collector means for collecting product [(19)] from the surface [(5)] of the support element [(3)], characterised in that the surface [(5)] includes an undercut trough [(13,14)] into which the at least one reactant [(15)] is directly supplied by the feed means [(4)] when the reactor apparatus is in use, and in that, upon rotation of the support element [(3)], the at least one reactant [(15)] forms a generally annular film [(16)] within the at least one undercut trough [(13,14)] and passes therefrom across the surface [(5)] of the support element [(3)].

2.(Amended) A reactor as claimed in claim 1, wherein the axis [(6)] is substantially parallel to a direction of action of terrestrial gravity.

3.(Amended) A reactor as claimed in claim 1, wherein the axis [(6)] is inclined with respect to a direction of action of terrestrial gravity.

4.(Amended) A reactor as claimed in claim 1[or 3], wherein the axis [(6)] is substantially

perpendicular to a direction of action of terrestrial gravity.

5.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the trough [(13,14)] is centrally located in the region of the axis [(6)].

6.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the trough [(13,14)] is in the form of an annulus.

7.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the trough [(13,14)] is centred about the axis [(6)].

8.(Amended) A reactor as claimed in [any one of] claim[s] 1[to 6], wherein the trough [(13,14)] is not centred on the axis.

9.(Amended) A reactor as claimed in [any preceding] claim 1, wherein a plurality of troughs [(13,14)] is provided in the surface [(5)].

10.(Amended) A reactor as claimed in claim 9, wherein each trough [(13,14)] has associated with it a feed means [(4)].

11.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the trough [(13,14)] is provided with a matrix which serves to assist reactant [(15)] in the trough [(13,14)] to rotate with the support element [(3)] when this is rotated.

12.(Amended) A reactor as claimed in claim 11, wherein the matrix comprises a fibrous mesh.

13. A reactor as claimed in claim 12, wherein the fibrous mesh is made of a metallic material.

14.(Amended) A reactor as claimed in claim 12[or 13], wherein the fibrous mesh includes a catalytic material.

15.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the collector means includes a receptacle [(7)] in the form of a bowl or trough at least partially surrounding the support element [(3)].

16.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the collector means includes a deflector positioned about a periphery of the support element [(3)], against which product [(19)] is thrown from an edge region of the surface [(5)] when the support element [(3)] is rotating at an appropriate speed.

17.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the collector means is coated or otherwise provided with a catalytic material.

18.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the collector means includes means for heating or cooling product [(19)] in the collector means to a predetermined temperature.

19.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the collector means is provided with feed means for adding a reactant to product [(19)] collected therein.

20.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the collector means comprises a wall [(18)] disposed on a periphery of the support element [(3)] and extending from the surface [(5)].

21.(Amended) A reactor as claimed in claim 20, wherein the collector means further comprises a pitot tube [(20)] which extends close to the surface [(5)] in the region of the wall [(18)] and which serves to remove product [(19)] from this region when the support element [(3)] is rotated.

22.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the collector means is adapted at least partially to recycle collected product [(19)] to the trough [(13,14)] as feed reactant.

23.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the trough [(13,14)] is coated or otherwise provided with a catalytic material.

24.(Amended) A reactor as claimed in [any preceding] claim 1, including a plurality of support elements [(3)].

25.(Amended) A reactor as claimed in claim 24, wherein the plurality of support elements [(3)] is mounted on a single axis of rotation [(6)].

26.(Amended) A reactor as claimed in claim 24, wherein the plurality of support elements [(3)] is mounted on a plurality of axes of rotation [(6)].

27.(Amended) A reactor as claimed in [any one of] claim[s] 24[to 26], wherein product [(19)] collected from a first support member [(3)] is used as feed for a second support member [(3)].

28.(Amended) A reactor as claimed in [any one of] claims 24[to 26], wherein feed means [(4)] connected in parallel are used to supply reactant [(15)] to each support element [(3)] and in which collector means [(20)] connected in parallel are used to collect product [(19)] from each

support element [(3)].

29.(Amended) A reactor as claimed in claim 27, wherein a processing unit [(22)] is provided between the collector means [(21)] of the first support member [(3)] and the feed means [(4)] of the second support member [(3)].

30.(Amended) A reactor as claimed in claim 29, wherein the processing unit [(22)] is a pump, an extruder, a heater or a heat exchanger.

31.(Amended) A reactor as claimed in [any preceding] claim 1, wherein the feed means [(4)] includes means for applying electromagnetic radiation or energy to the reactant [(15)].

32.(Amended) A reactor as claimed in [any preceding] claim 1, further including means for applying vibration to the support member [(3)].

33.(Amended) A reactor as claimed in [any preceding] claim 1, wherein there is further provided a rotary impeller or fan [(70)] mounted close to the surface [(5)] and operable to generate a gaseous flow from a periphery of the surface [(5)] towards a central region thereof, this flow being counter-current to a flow of reactant [(15)] on the surface [(5)].

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